

In re Patent Application of:

FONDEUR ET AL.

Serial No. 10/736,295

Filed: 12/15/2003

Amendments to the Claims

1. (previously presented) A photolithographic mask set comprising:

a master mask including a first pattern having features for forming part of a planar lightwave circuit, the first pattern including a featureless region disposed therein such that the planar lightwave circuit is incomplete; and,

a slave mask including a second pattern having features for completing the planar lightwave circuit.

2. (original) A photolithographic mask set according to claim 1, wherein the second pattern is designed to correct systematic errors induced by the master mask.

3. (original) A photolithographic mask set according to claim 1, wherein the second pattern has been experimentally optimized using a plurality of other slave masks.

4. (original) A photolithographic mask set according to claim 1, wherein a perimeter of the featureless region and a perimeter of the slave mask have a same shape and dimensions.

5. (original) A photolithographic mask set according to claim 1, wherein the master mask and the slave mask are written on different regions of a same plate.

6. (original) A photolithographic mask set according to claim 5, wherein the slave mask is written at a periphery of the master mask.

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7. (original) A photolithographic mask set according to claim 1, wherein the master mask and the slave mask are written on different plates.

8. (original) A photolithographic mask set according to claim 7, comprising a plurality of other slave masks written on the same plate as the slave mask.

9. (currently amended) A method of utilizing a photolithographic mask set, the method comprising the steps of:

(a) providing a photolithographic mask set including a master mask and a slave mask, the master mask including a first pattern having features for forming part of ~~the~~ a planar lightwave circuit and including a featureless region disposed within the first pattern such that the planar lightwave circuit is incomplete, the slave mask including a second pattern having features for completing the planar lightwave circuit;

(b) using the photolithographic mask set to expose at least part of a substrate;

(c) processing the exposed substrate to fabricate the planar lightwave circuit;

(d) analyzing the fabricated planar lightwave circuit;
and

(e) determining an optimized planar lightwave circuit in dependence upon the analysis.

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10. (previously presented) A method according to claim 9, comprising the step of fabricating the optimized planar lightwave circuit.

11. (original) A method according to claim 9, wherein step (b) comprises:

aligning the master mask above the substrate and exposing the substrate through the master mask; and,

aligning the slave mask above the substrate and exposing the substrate through the slave mask, the slave mask aligned such that features in the second pattern align with corresponding features in the first pattern on the substrate.

12. (previously presented) A method according to claim 9, wherein step (d) comprises measuring at least one of phase and amplitude errors of the fabricated planar lightwave circuit.

13. (original) A method according to claim 12, wherein step (d) further comprises using the at least one measured error to design at least one correcting slave mask.

14. (original) A method according to claim 13, wherein step (d) further comprises repeating steps (b) through (d) for the at least one correcting slave mask.

15. (previously presented) A method according to claim 9, wherein step (e) comprises calculating a desired modification to the slave mask to modify a property of the planar lightwave circuit.

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16. (original) A method according to claim 9, wherein step (b) comprises stitching the slave mask to the master mask about a periphery of the featureless region.

17. (original) A method according to claim 13, comprising the step of writing a production mask from data from the master mask and the at least one correcting slave mask.

18. (original) A method according to claim 9, wherein step (b) comprises the step of exposing a resist layer formed on an optical core layer.

Claims 19-35 (cancelled)

36. (previously presented) A photolithographic mask set according to claim 1, wherein the first pattern is for providing a general layout of the planar lightwave circuit, and wherein the features in the second pattern are for tuning the planar lightwave circuit.

37. (new) A photolithographic mask set according to claim 1, wherein the slave mask is for providing a modifier section selected for optimizing the planar lightwave circuit.

38. (new) A photolithographic mask set according to claim 37, wherein the at least one modifier section includes a plurality of waveguides that are modified relative to a corresponding plurality of waveguides outside the modifier section.

39. (new) A photolithographic mask set according to claim 38, wherein the modifications comprise at least one of an expanded width of a waveguide, a gap within a waveguide and a lateral offset between a section of a waveguide within the modifier

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section and a section of the waveguide outside the modifier section.

40. (new) A photolithographic mask set according to claim 39, wherein the planar lightwave circuit comprises an arrayed waveguide grating having a plurality of waveguides of different lengths arranged in an arc on a substrate.

41. (new) A photolithographic mask set according to claim 40, wherein the at least one modifier section substantially bisects the arc.